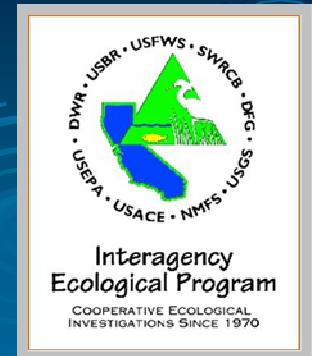


Zooplankton Update 2008: Got copepods?

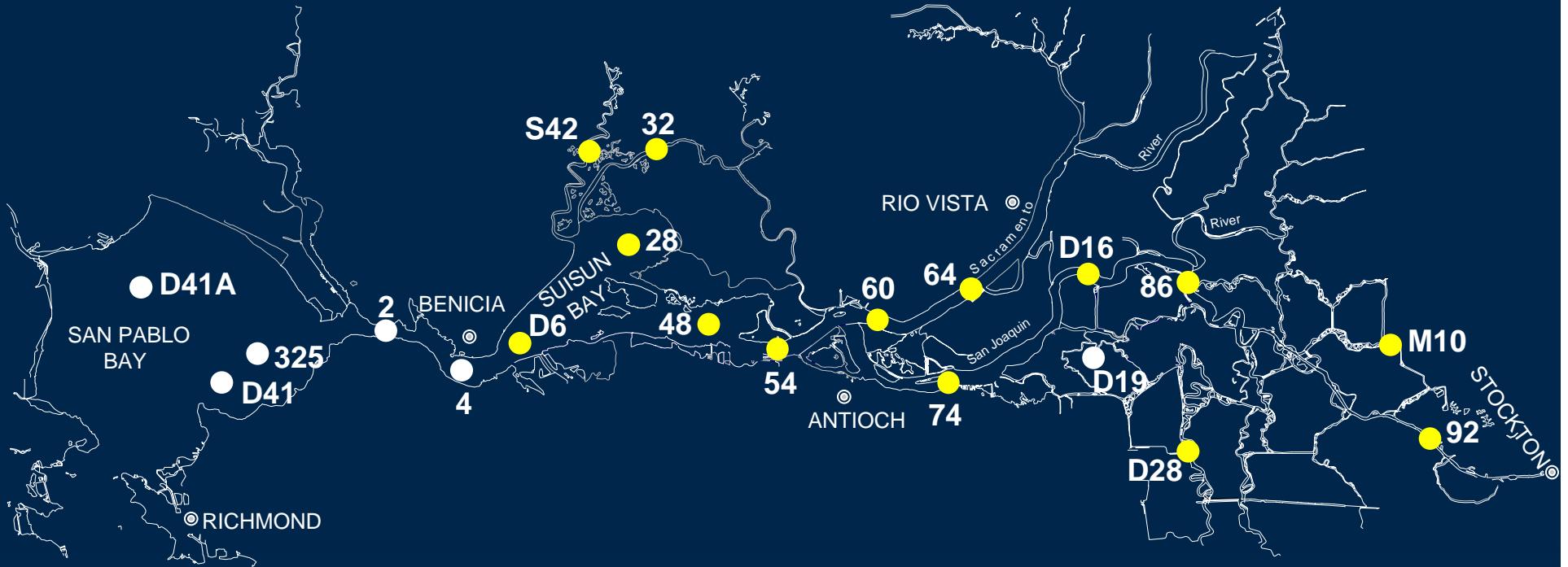
April R. Hennessy
California Department of Fish and Game
June 25, 2009
IEP Workshop



Overview

- Zooplankton Study background
- Copepod and mysid species composition
- Interannual seasonal comparisons
- How did 2008 stack up?
- Distribution and abundance of jellies in 2007 and 2008

Zooplankton Study Background



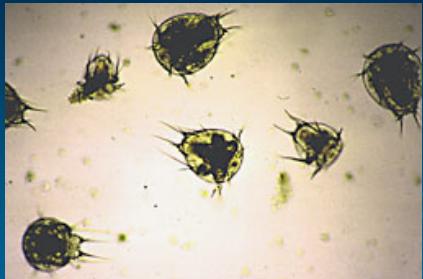
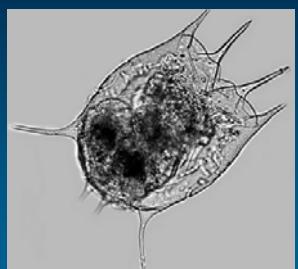
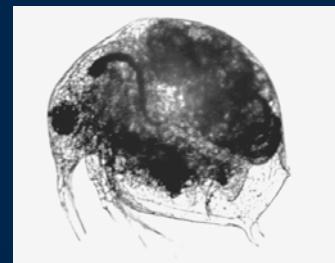
- Yellow indicate “core stations” - used to calculate indices for interannual comparison
- 3 gear types used to target different sizes of zooplankton

Zooplankton Study Sampling Gear



Macrozooplankton net- “mysid net”
targets zp 1-20 mm long
(mysids, amphipods, jellies)

Mesozooplankton net- “CB net”
targets zp 0.5-3.0 mm long
(adult calanoid copepods,
copepodids, cladocerans)



Pump- targets microzooplankton
<1 mm long
(rotifers, copepod nauplii, and adult
copepods of the genera *Oithona* and
Limnoithona)

Zooplankton Study Sampling Gear



“Native” copepod species

- Freshwater: *Diaptomus* spp., *Cyclops* spp.,
Acanthocyclops vernalis
- Low salinity zone: *Eurytemora affinis* (historically
important food item)
- High salinity zone: *Acartia* spp.

Introduced Copepod Species

- Freshwater:

Sinocalanus doerrii (1978)

Limnoithona sinensis (1979)

- Low salinity zone:

Pseudodiaptomus forbesi (1987)

Acartiella sinensis (1993)

Limnoithona tetraspina (1993)

- High salinity zone:

Oithona davisae (1963)

Pseudodiaptomus marinus (1986)

Tortanus dextrilobatus (1993)

Introduced Copepod Species

- Freshwater:

Sinocalanus doerrii (1978)

Limnoithona sinensis (1979)

- Low salinity zone:

Pseudodiaptomus forbesi (1987)

Acartiella sinensis (1993)

Limnoithona tetraspina (1993)

- High salinity zone:

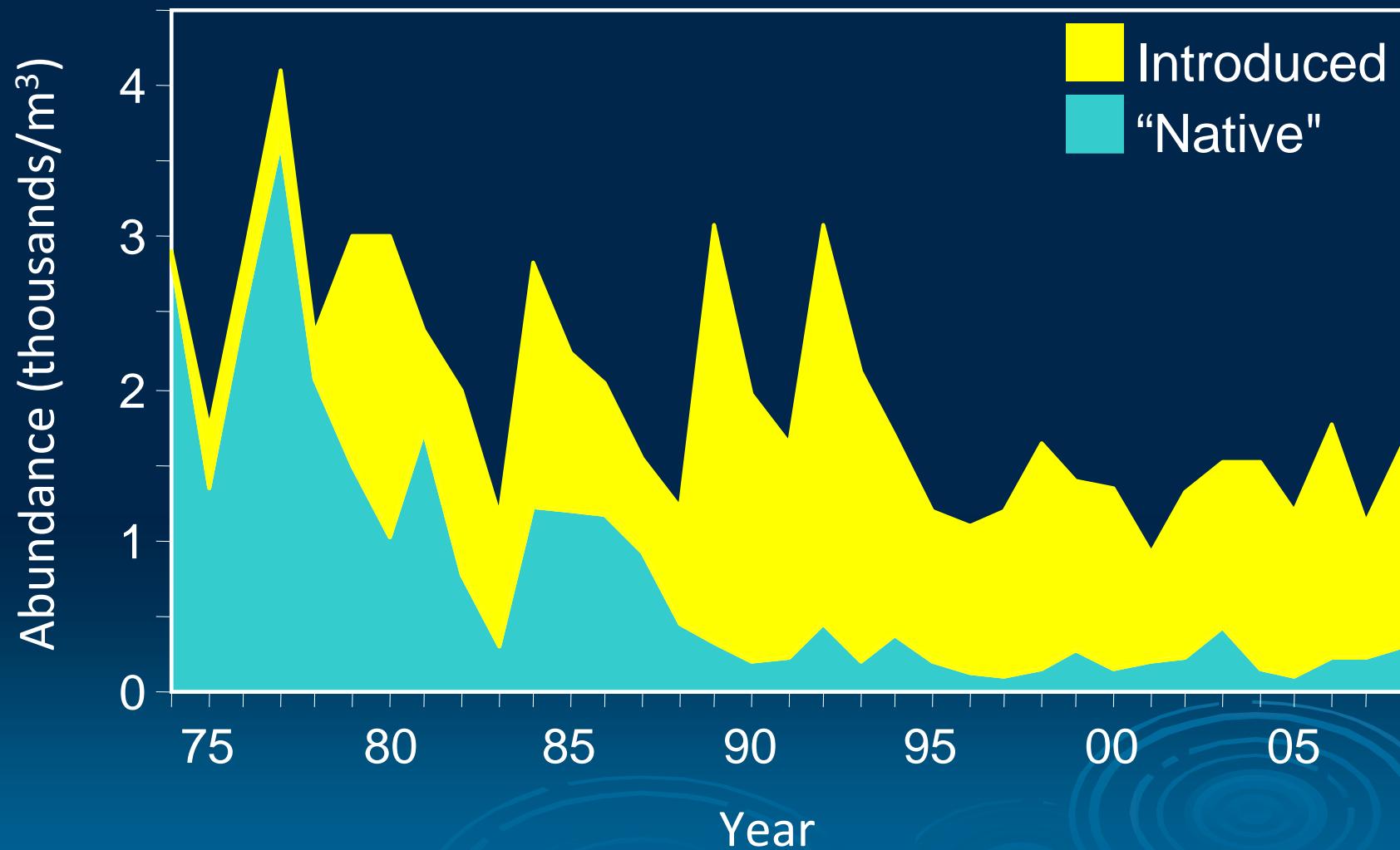
Oithona davisae (1963)

Pseudodiaptomus marinus (1986)

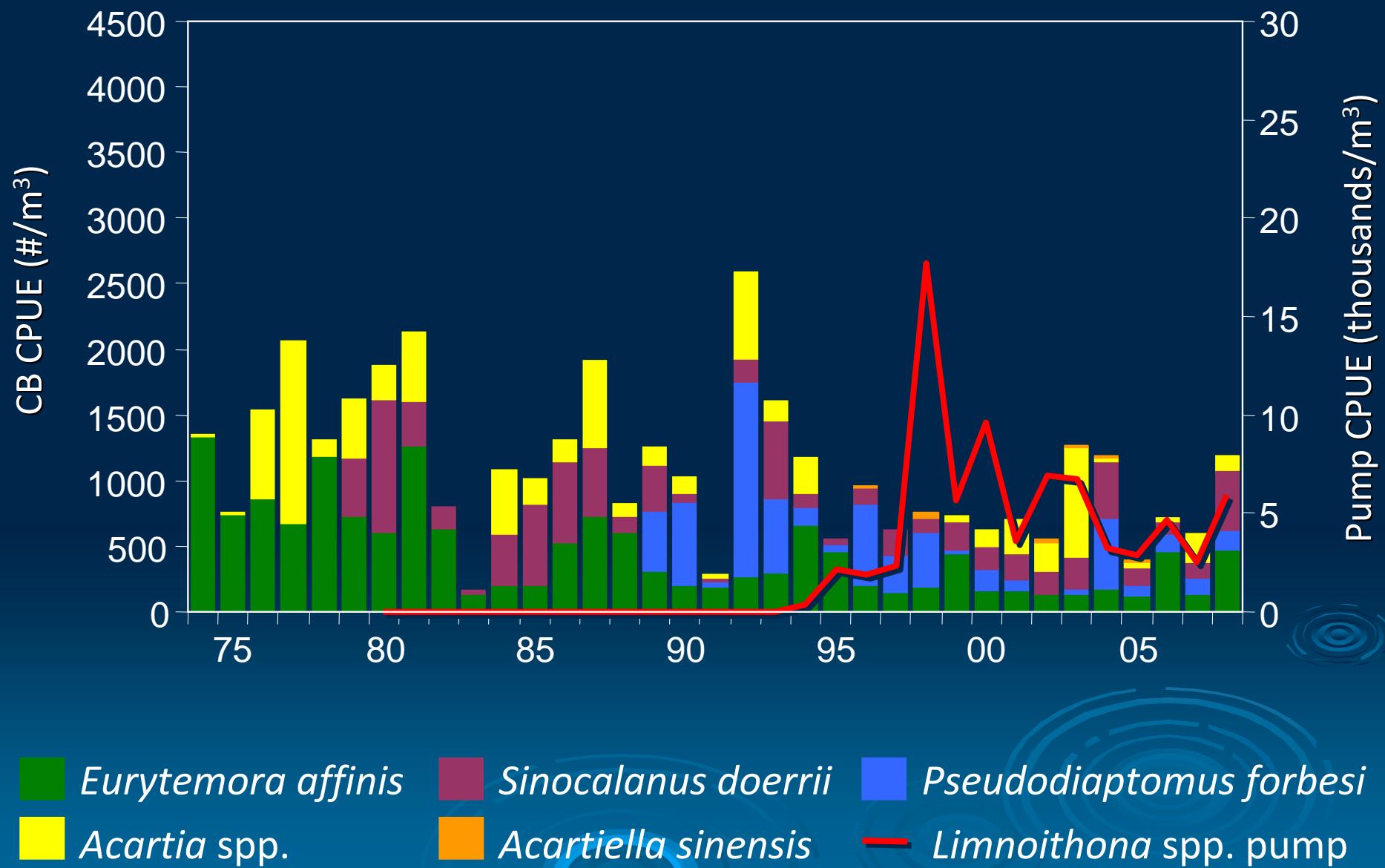
Tortanus dextrilobatus (1993)



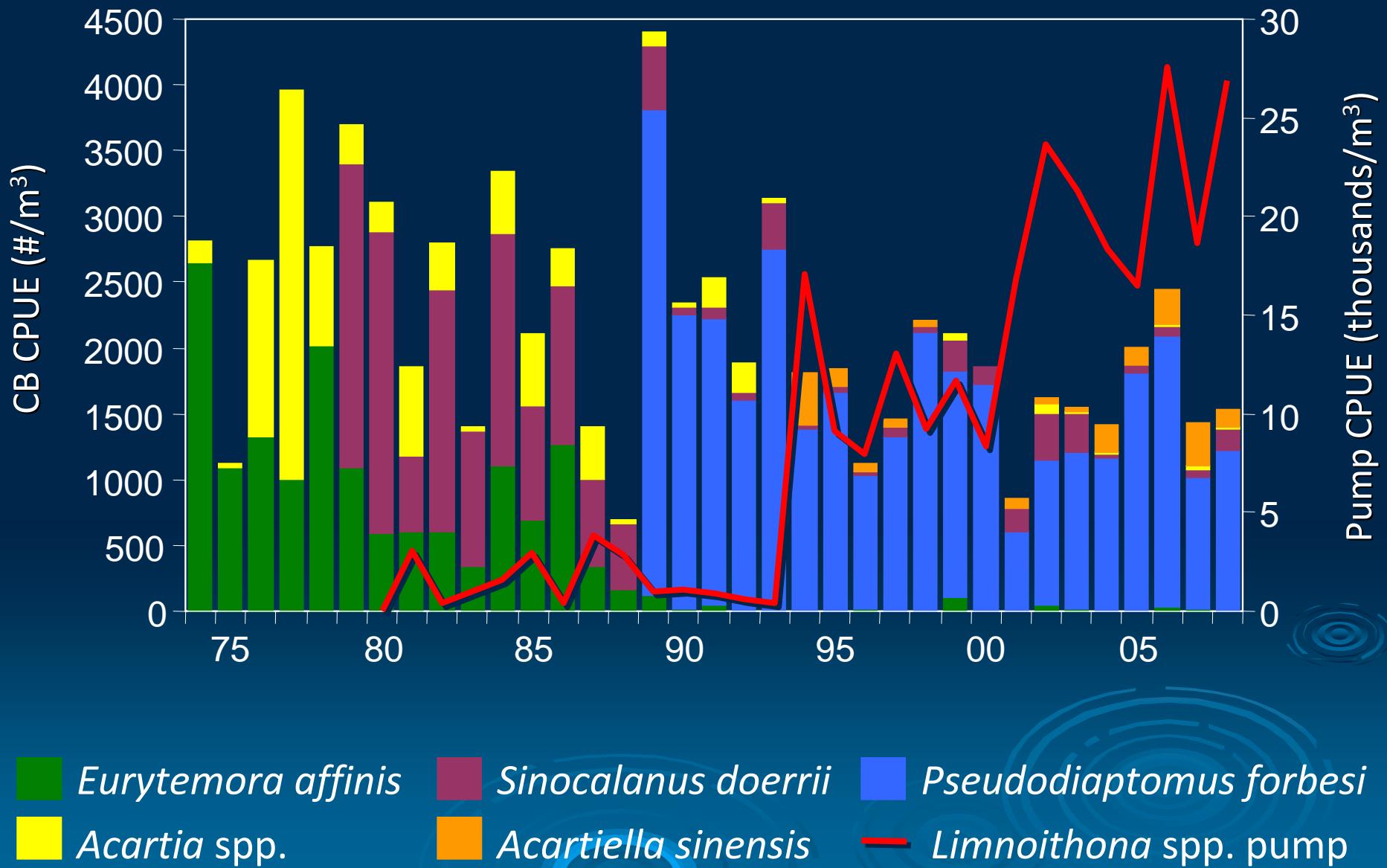
Adult Copepods



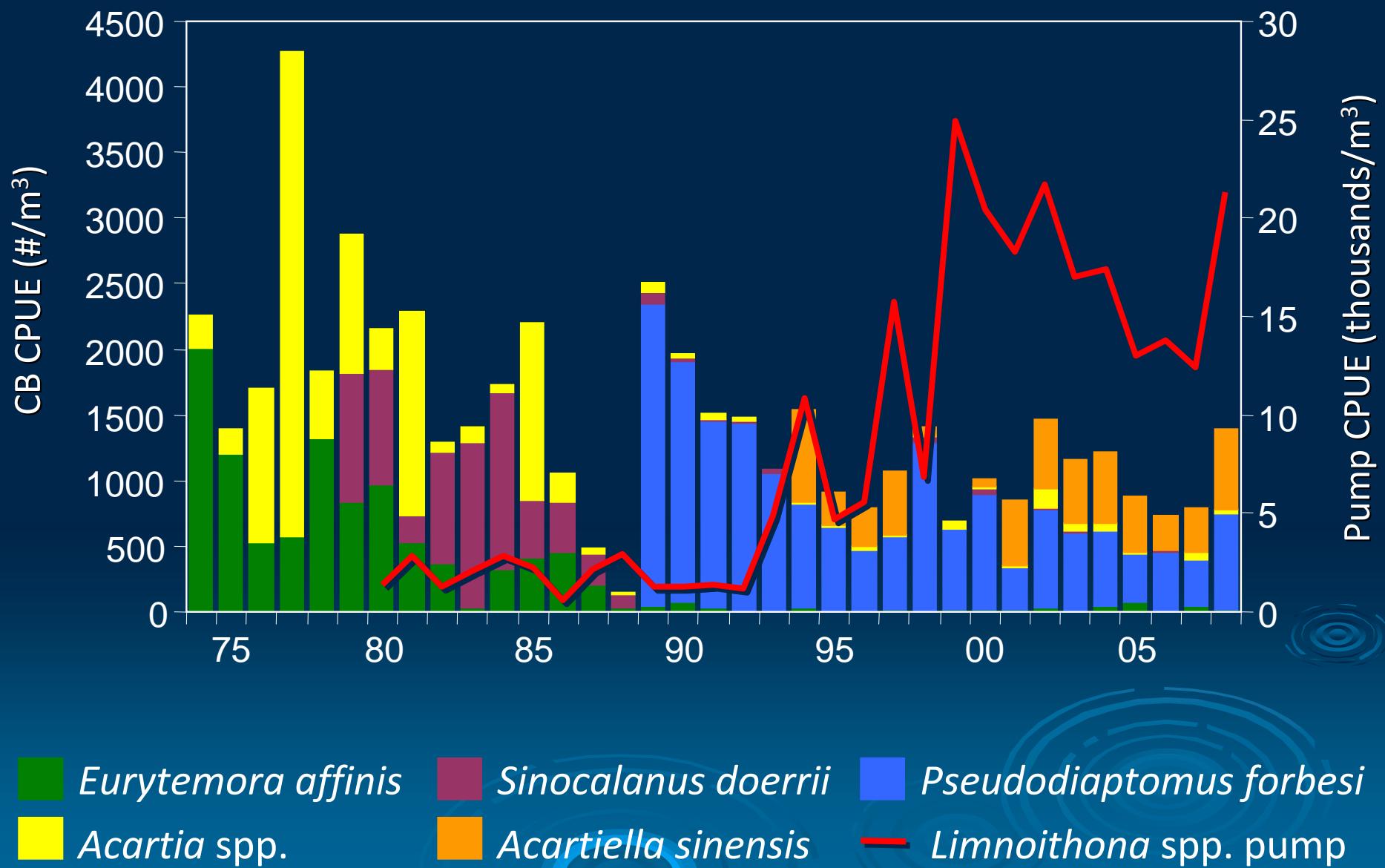
Spring (March-May)



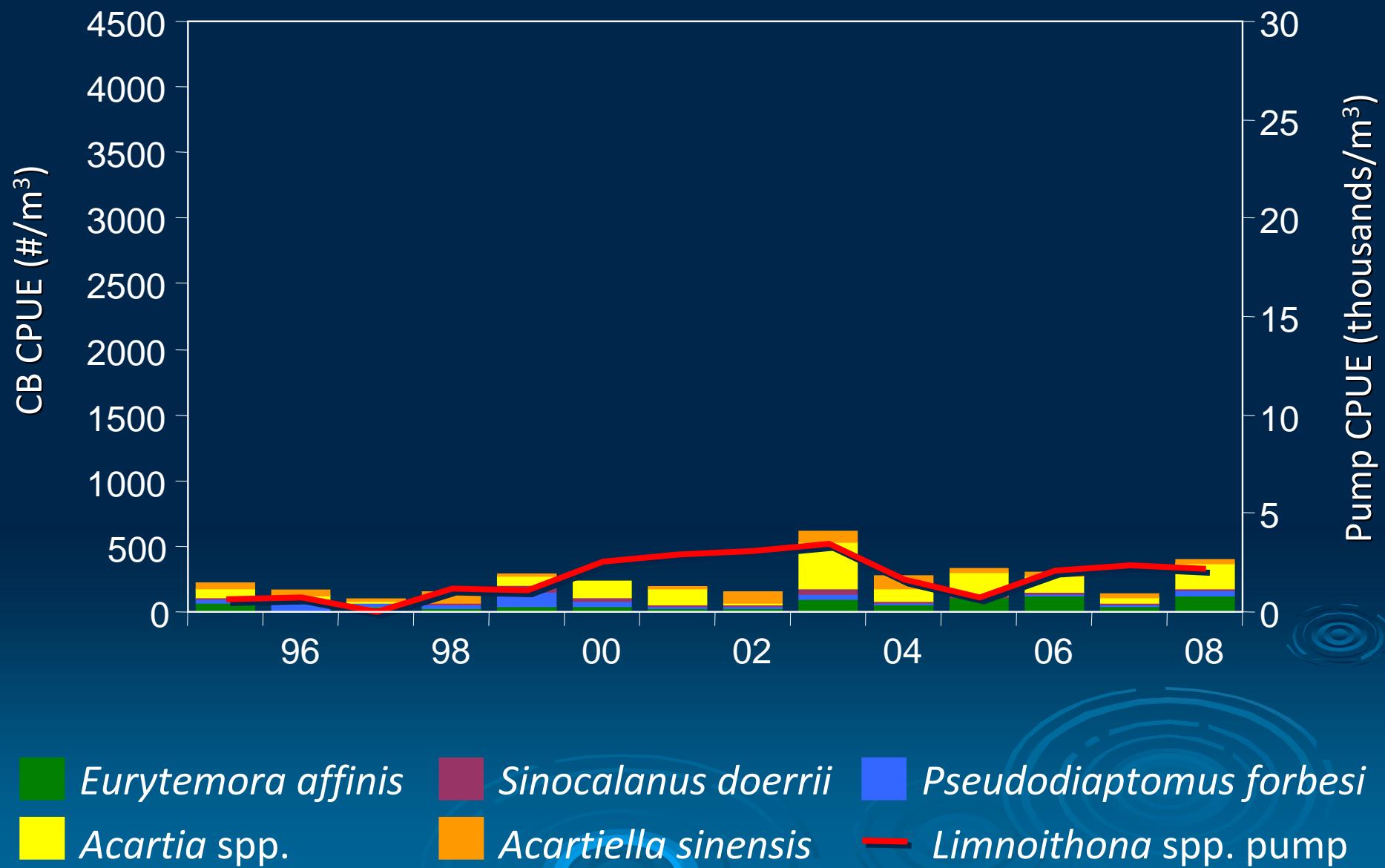
Summer (June-August)



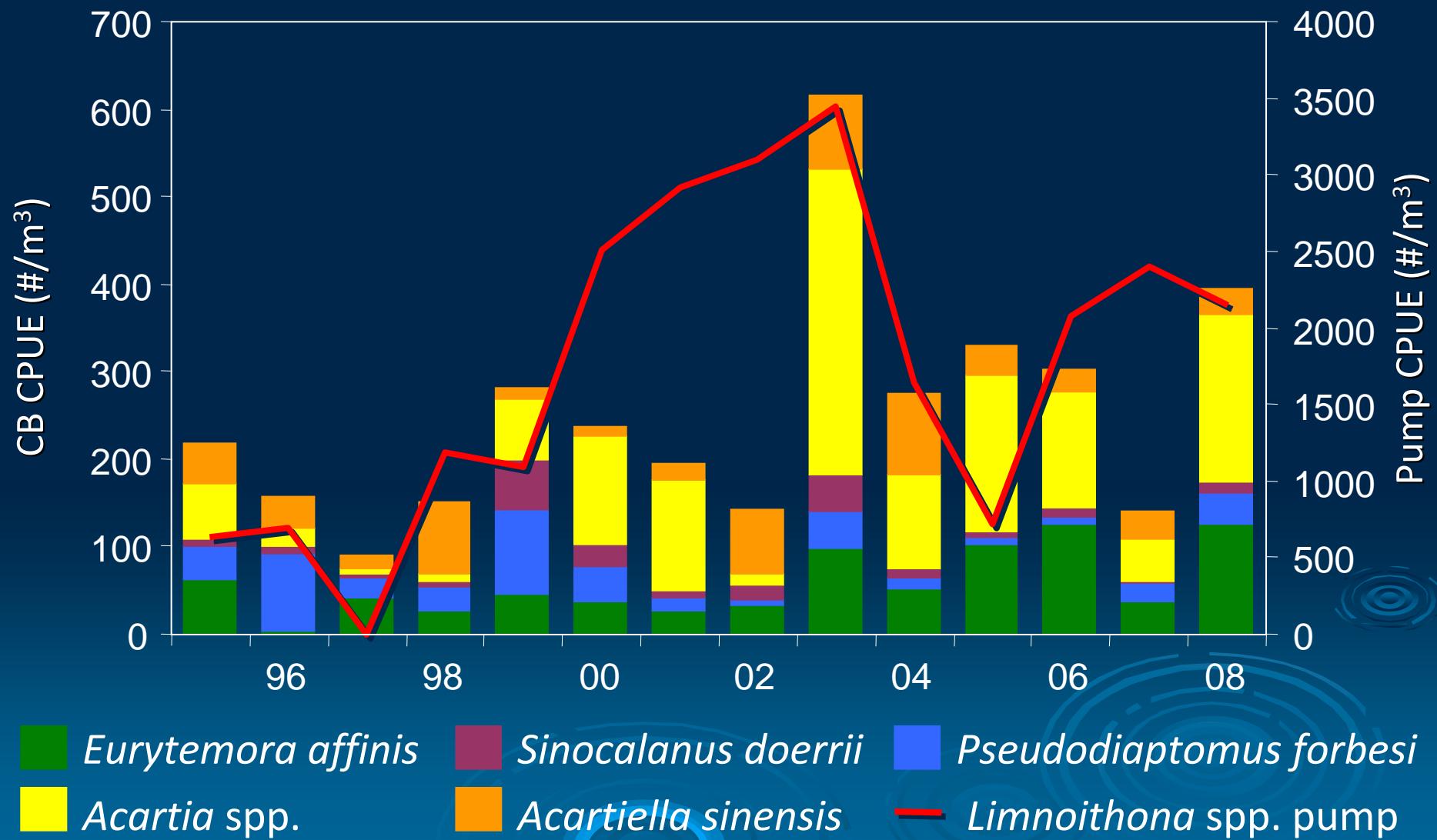
Fall (September-November)



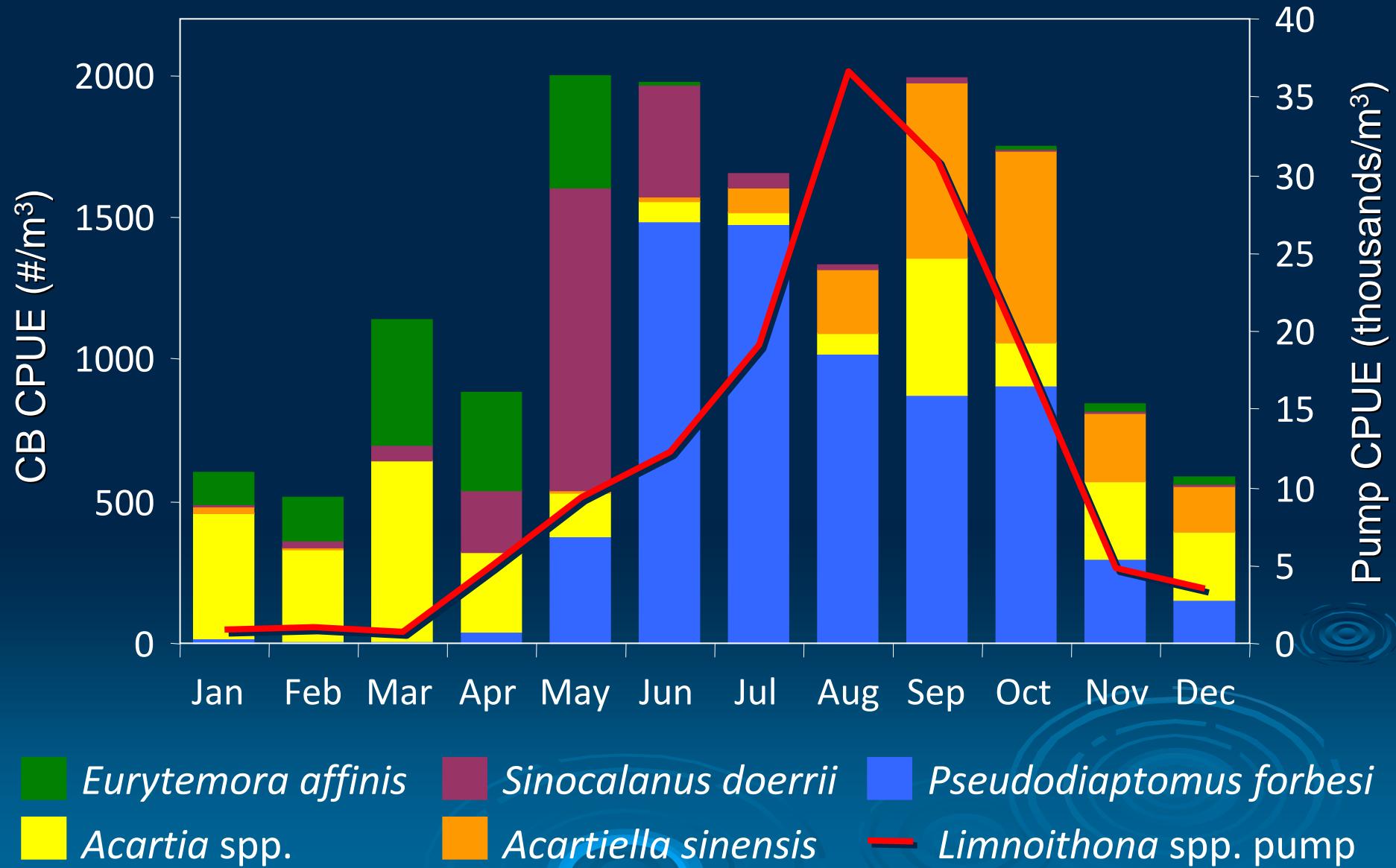
Winter (December-February)



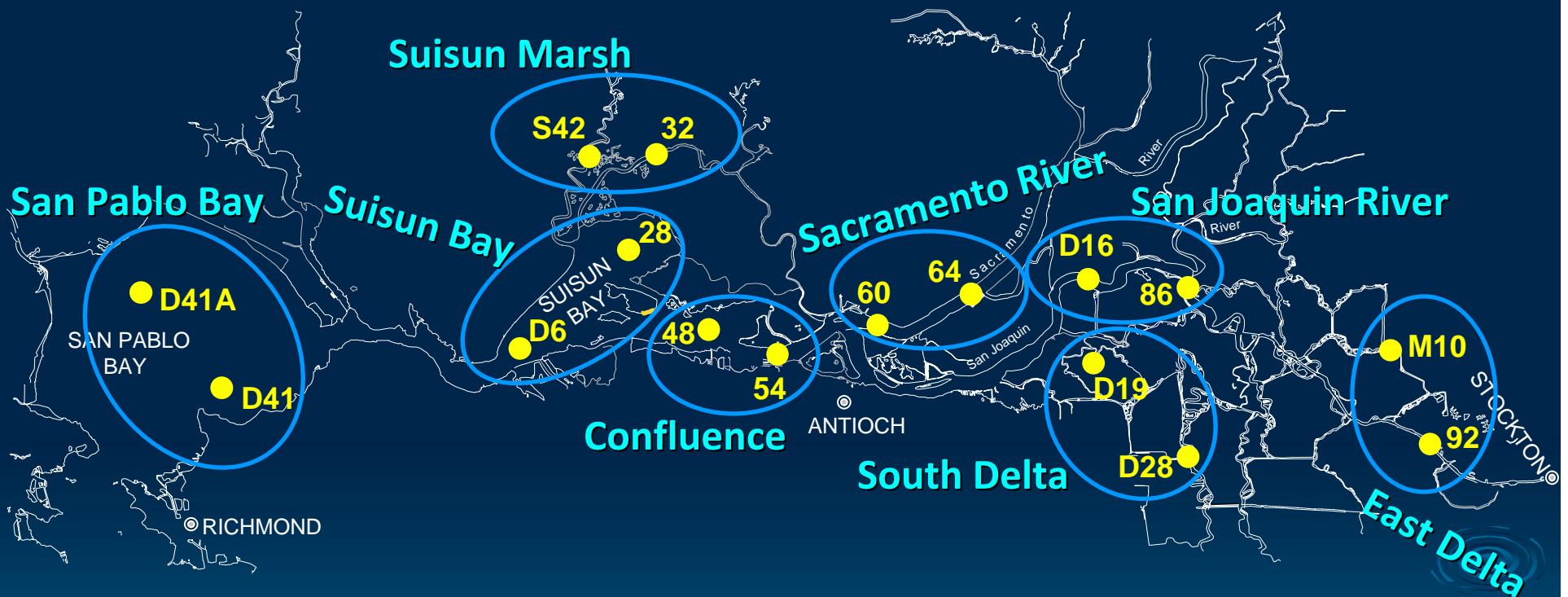
Winter (December-February)



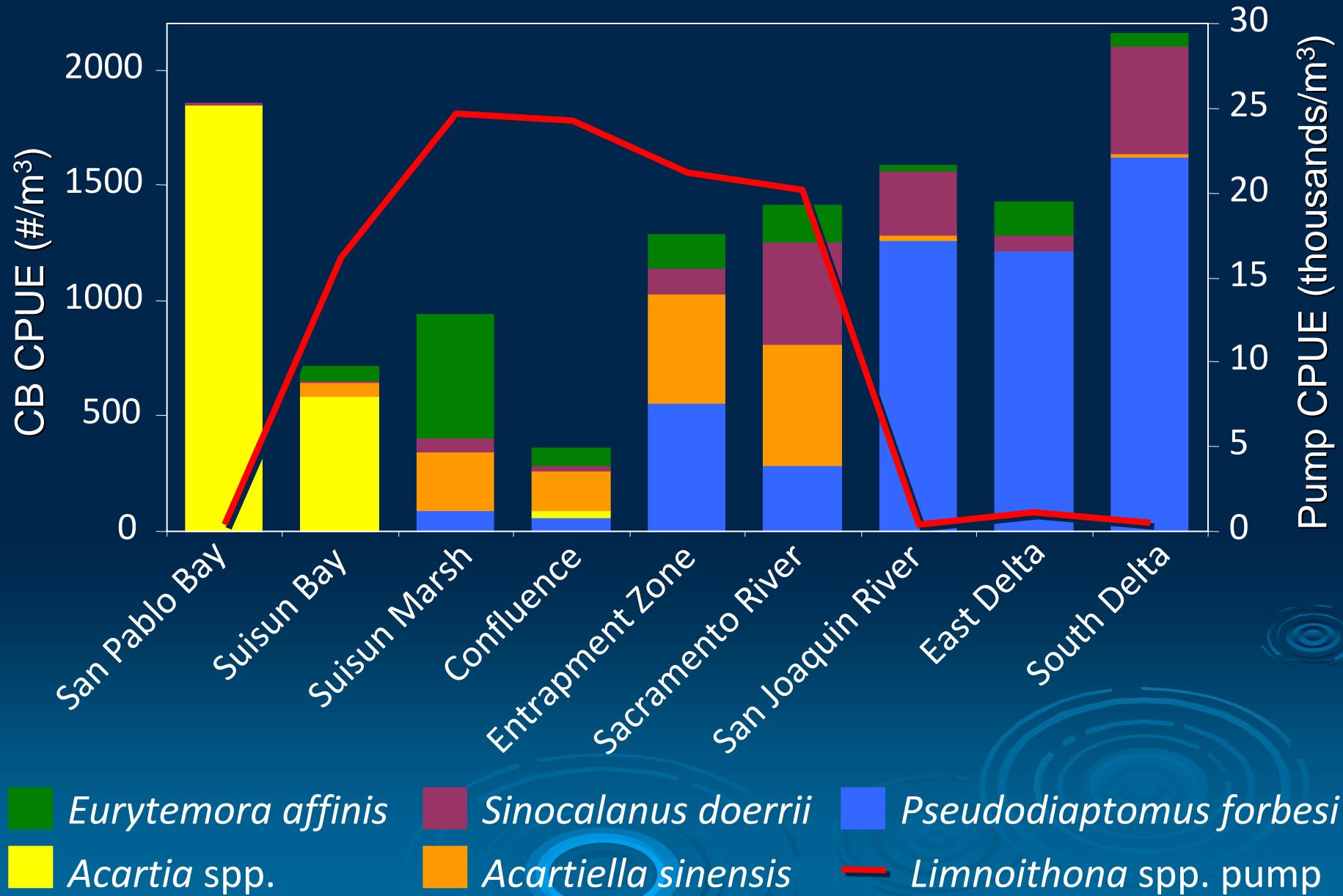
2008 Monthly Copepod Abundance



Geographic Regions



2008 Regional Copepod Abundance



Native Mysid Species

Neomysis mercedis

Neomysis kadiakensis

Alienacanthomysis macropsis

Deltamysis holmquistae



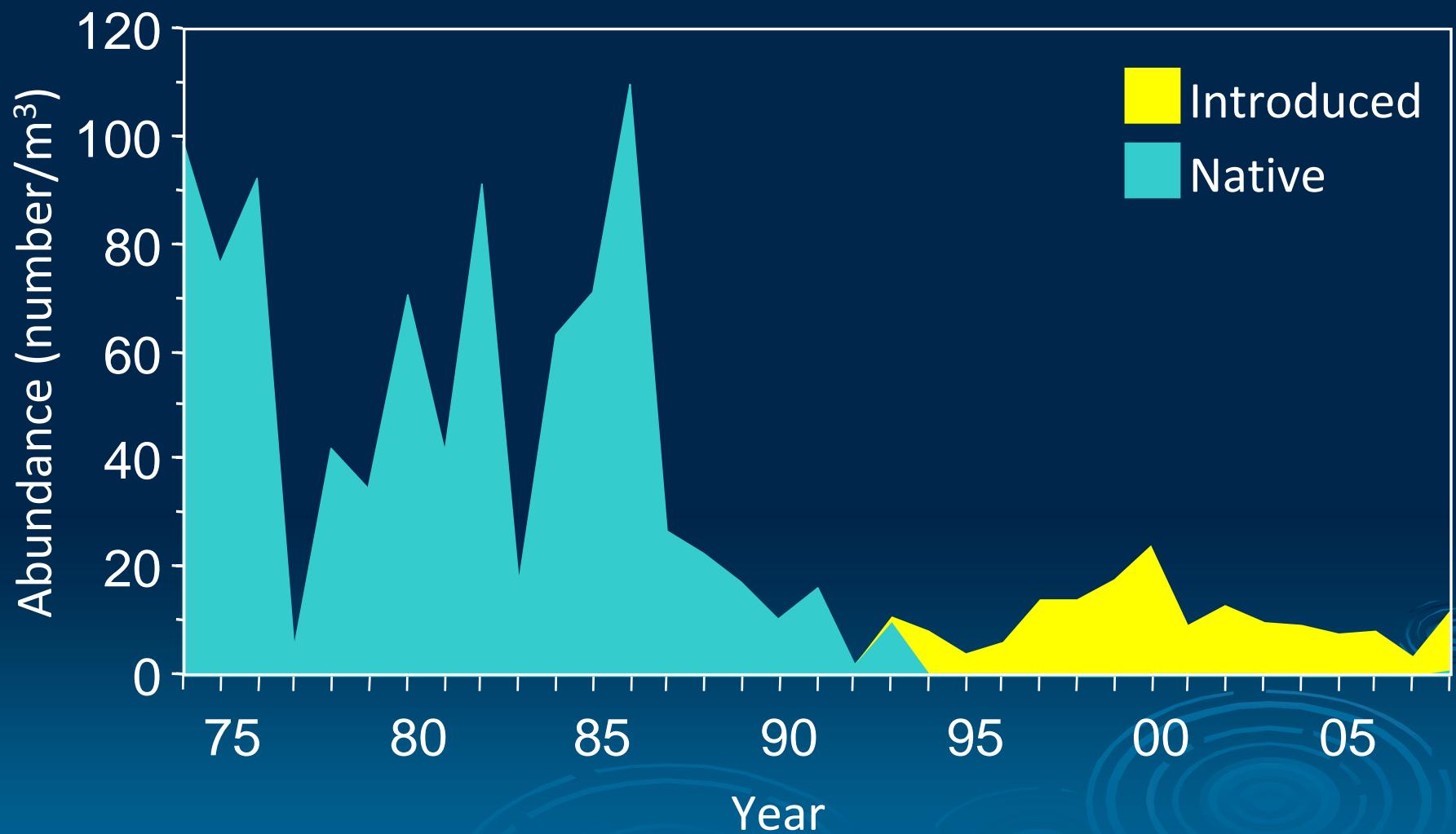
Introduced Mysid Species

Hyperacanthomysis longirostris (1992-
formerly *Acanthomysis bowmani*)

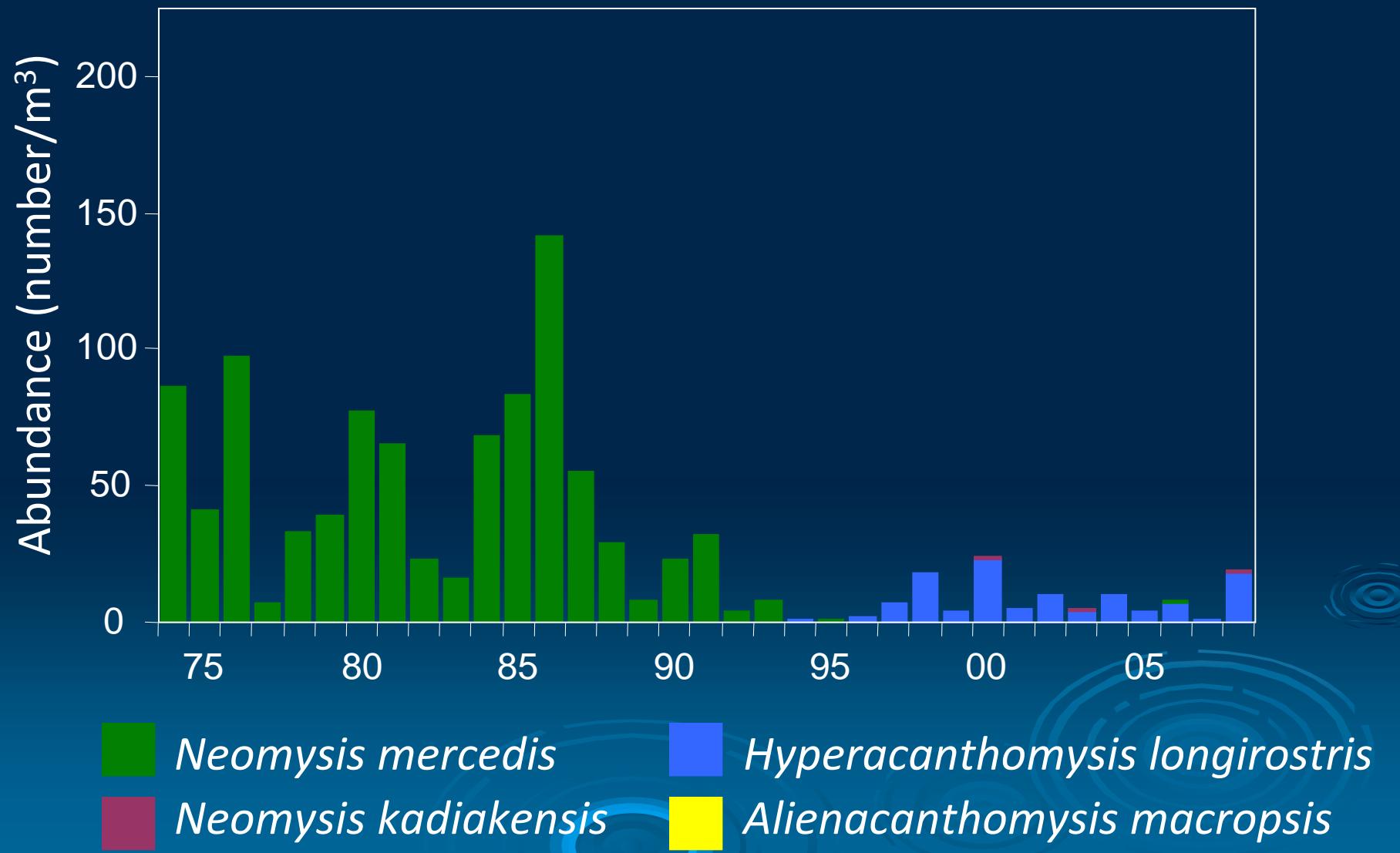
Acanthomysis aspera (1992)

Acanthomysis hwanghaiensis (1998)

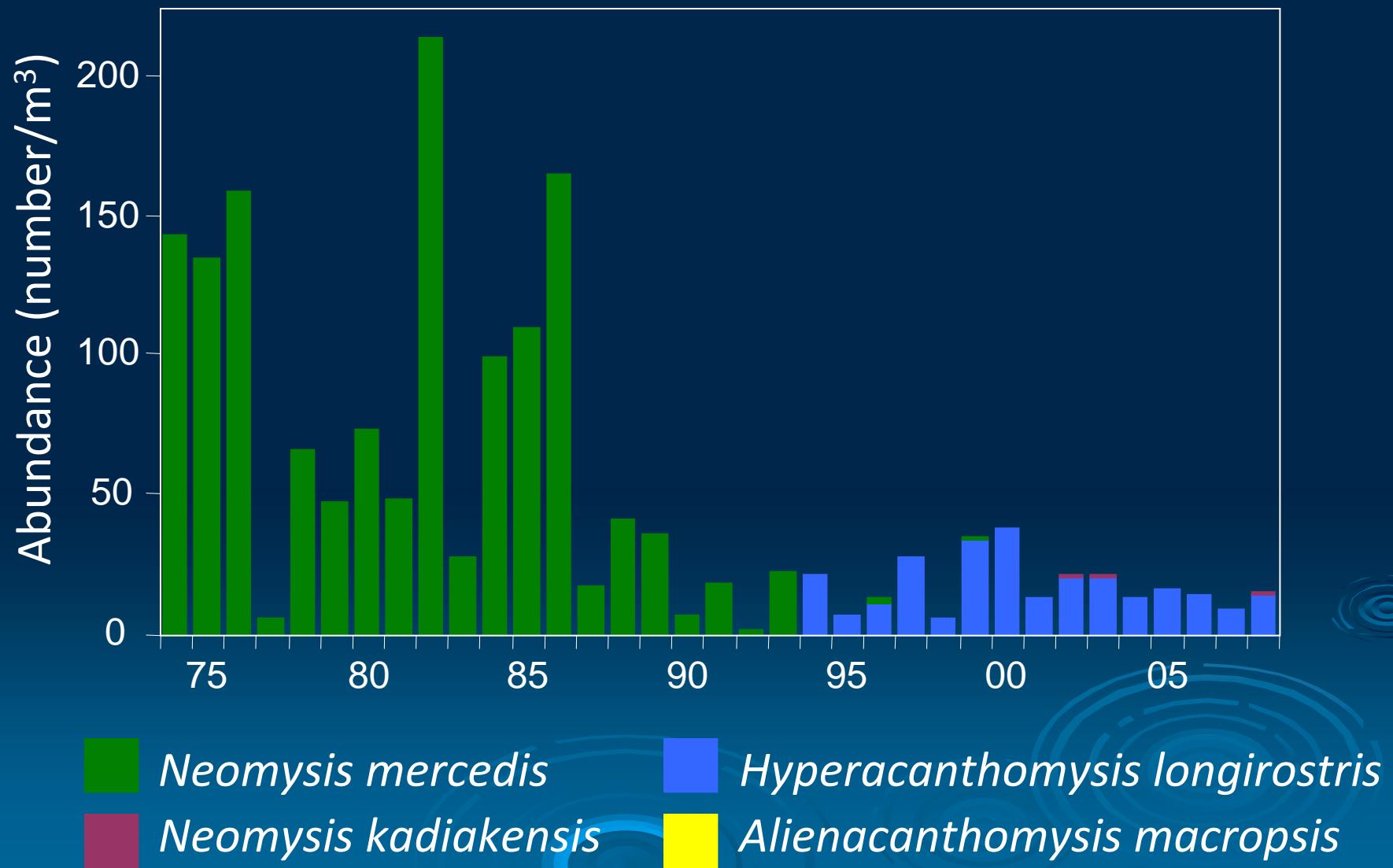
Mysids



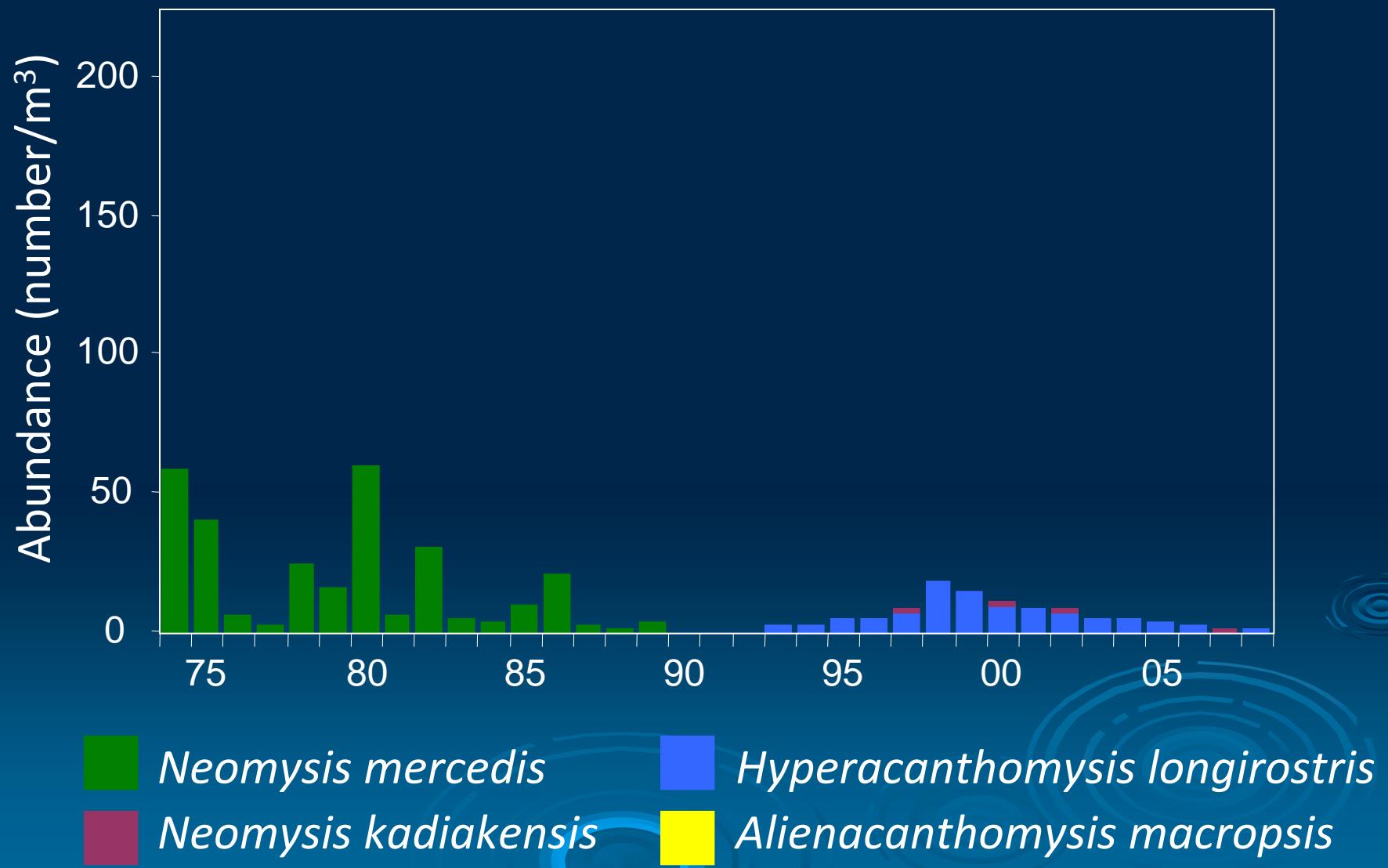
Spring (March-May)



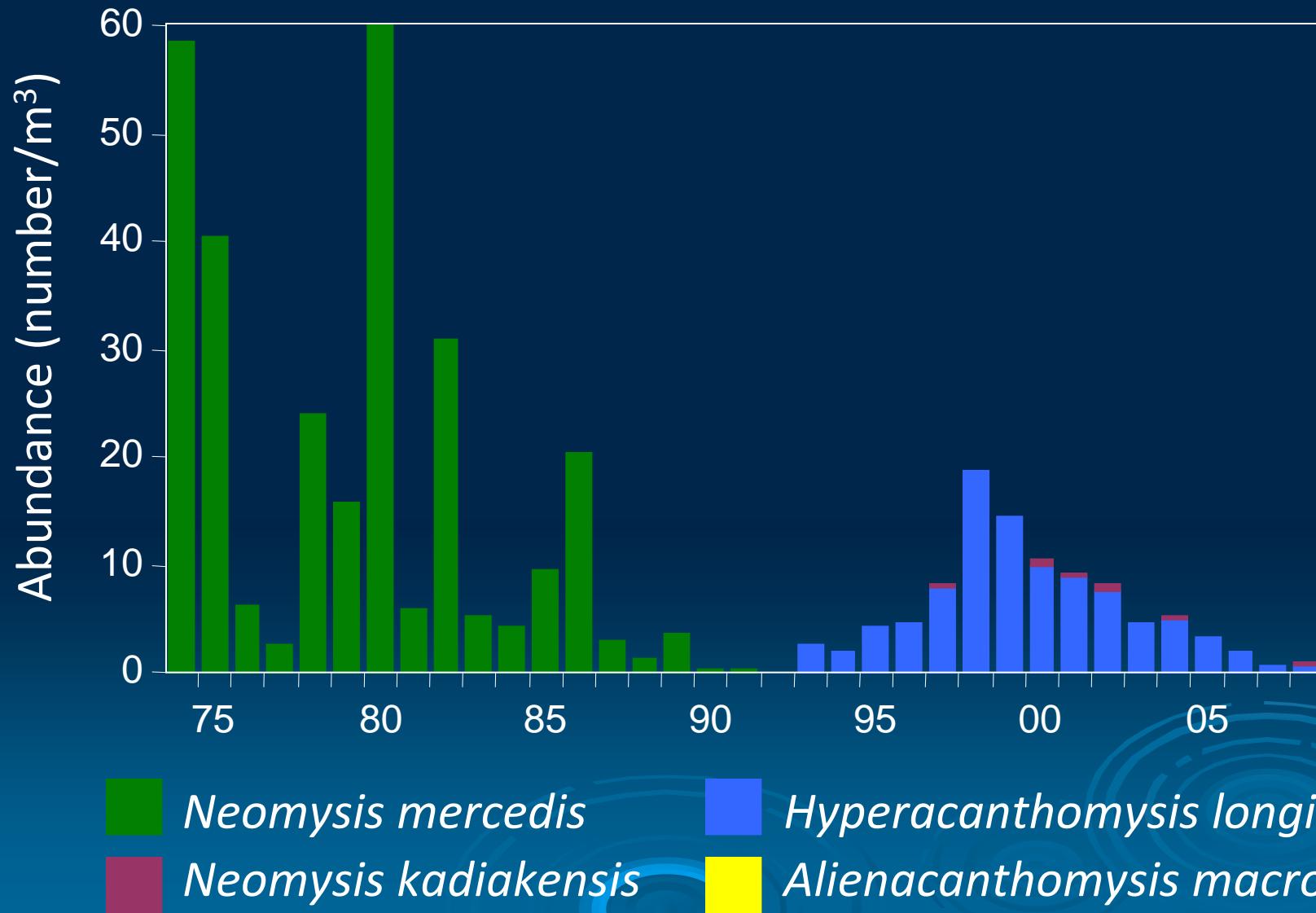
Summer (June-August)



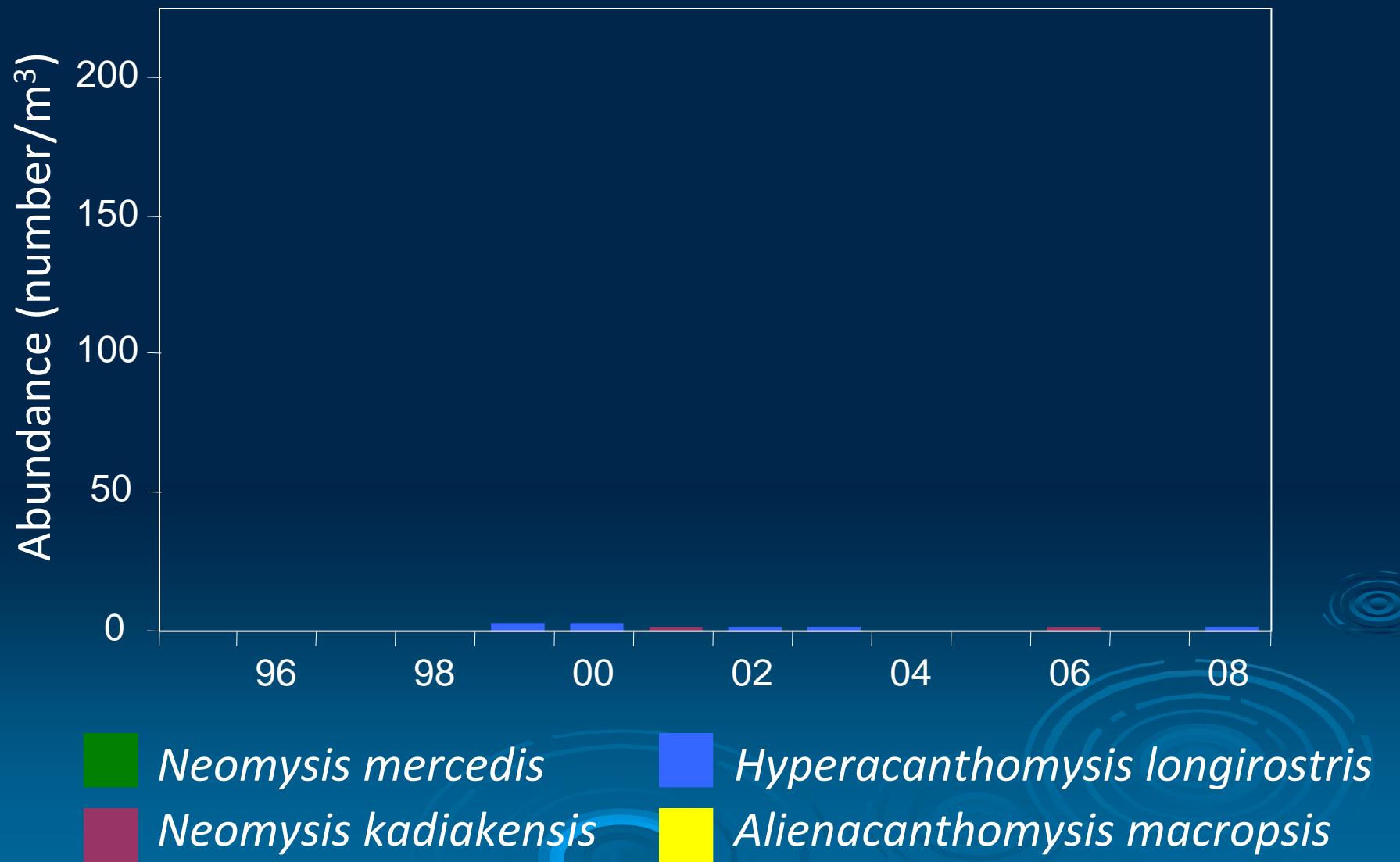
Fall (September-November)



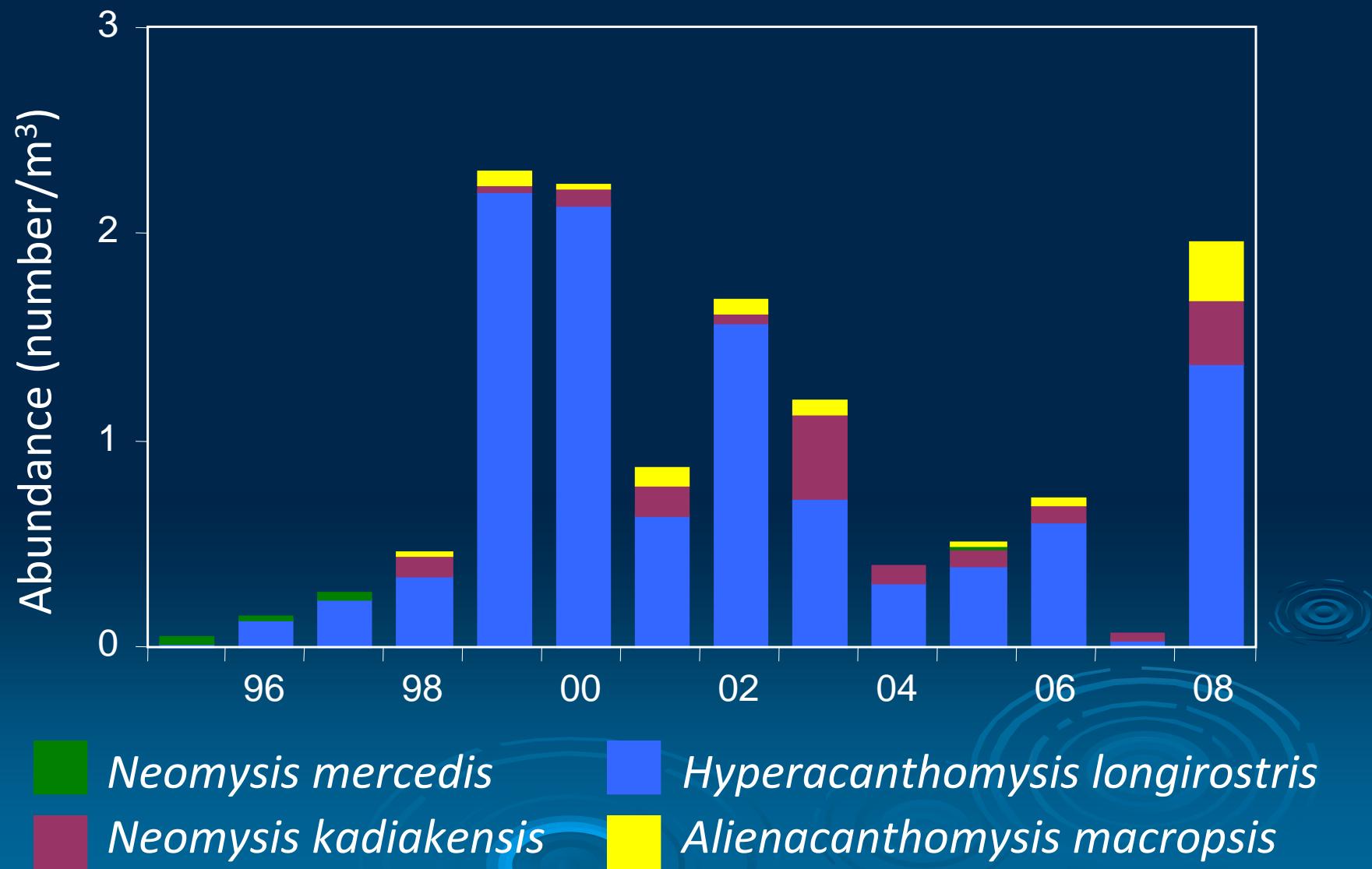
Fall (September-November)



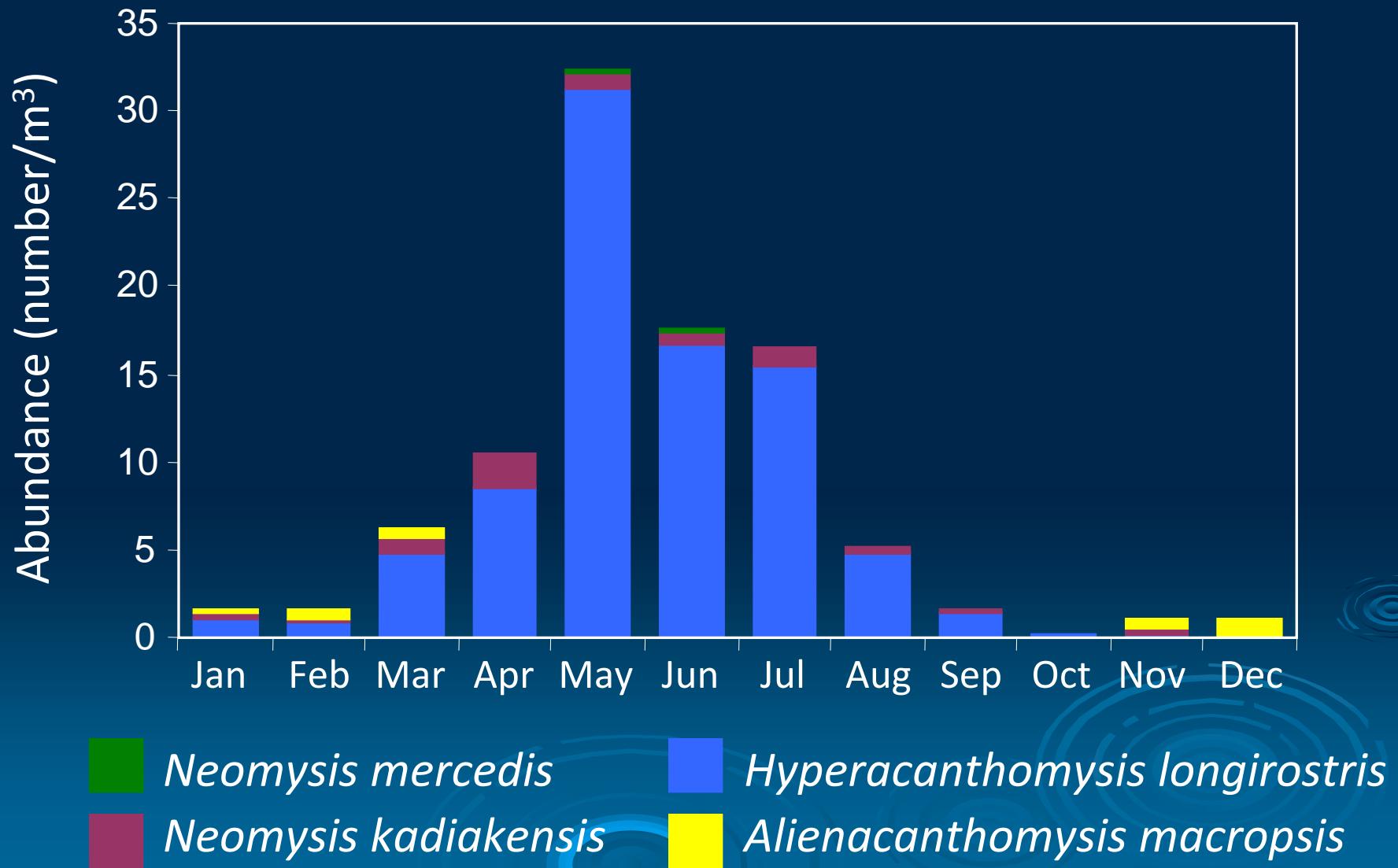
Winter (December-February)



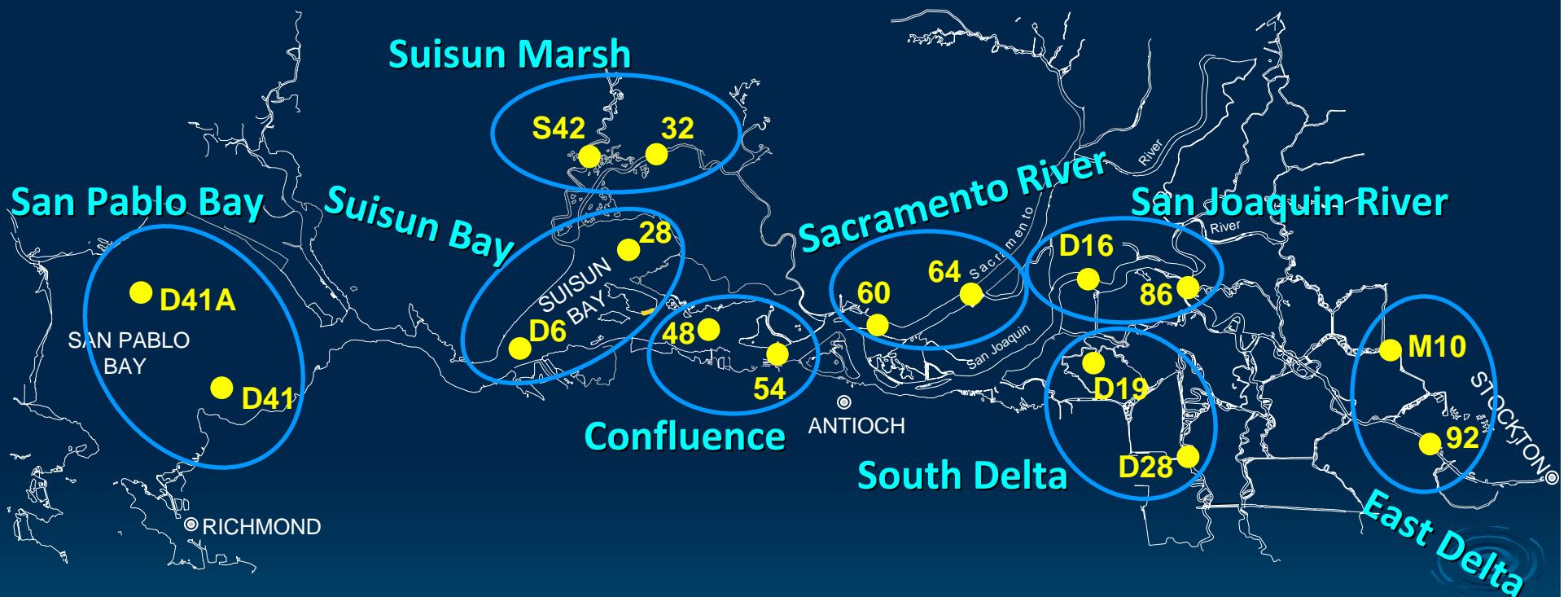
Winter (December-February)



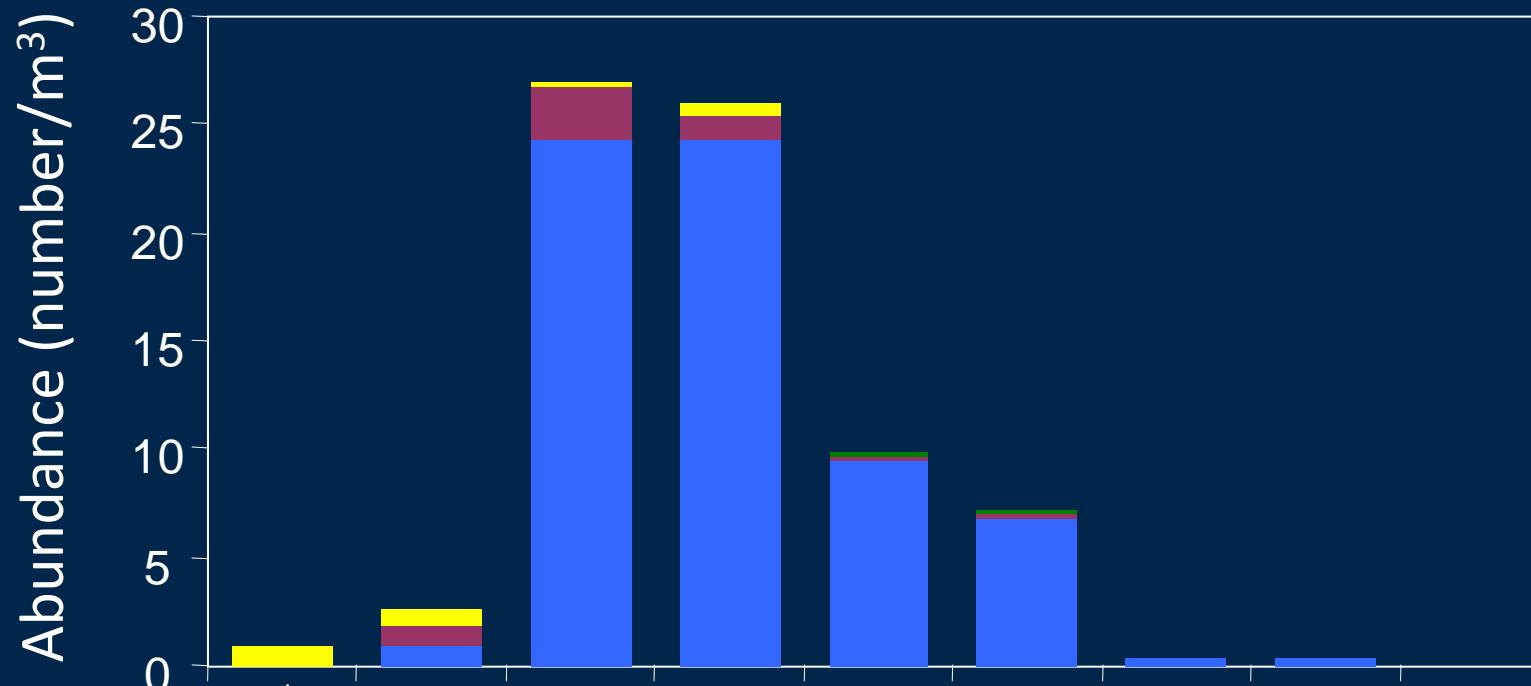
2008 Monthly Mysid Abundance



Geographic Regions



2008 Regional Mysid Abundance



Neomysis mercedis



Neomysis kadiakensis



Hyperacanthomysis longirostris



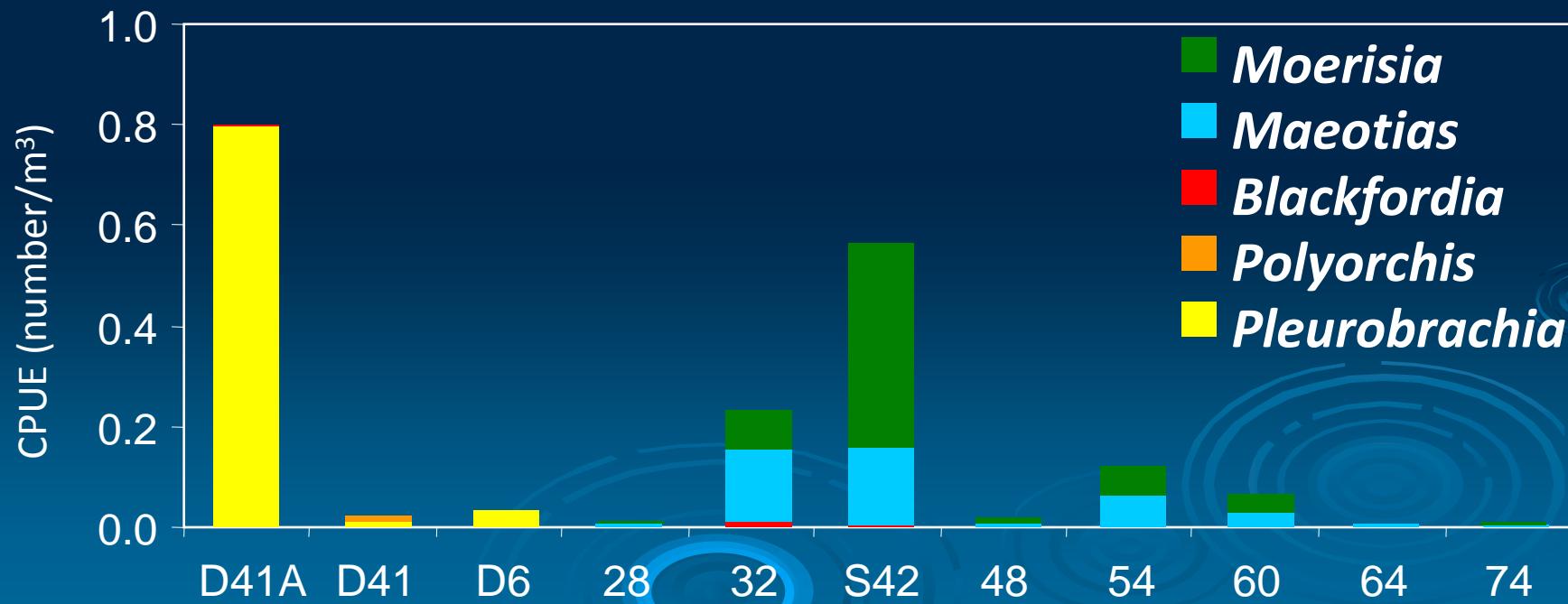
Alienacanthomysis macropsis

Jellies 2007-2008



- Stations with jellies
- No jellies
- No jellies, sampled Feb 2007 and 2008, and March 2008 only
- Not sampled

Jelly Abundance 2007-2008



Conclusions

- Zooplankton abundance has declined
- Introduced species more abundant than natives most of the year
- 2008 was OK considering low outflow
- Jellies becoming more widespread?

Acknowledgements

Kathy Hieb

Gregg Schmidt

Tina Enderlein

Scott Waller

Sally Skelton

Eric Santos

Tricia Bippus

Nick Sakata

Questions?

